



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/435,008 Confirmation No.: 3596  
Applicant(s) : Dang et al.  
Filed : January 12, 2004  
TC/AU : 1711  
Examiner : Duc Truong  
Docket No. : AFD 645  
Customer No.: 26902

Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

DECLARATION OF FRED E. ARNOLD

Under Rule 1.131

1. I, Fred E. Arnold, declare that:
2. I have a B.S. in Chemistry from the Southern Illinois University, an M.S. in Chemistry from the State University of Iowa and a PhD in Chemistry from the State University of Iowa.
3. I had been working in research and development in the Polymer Chemistry/Polymeric Materials art in the Polymer Branch, Wright-Patterson Air Force Base since 1966 and retired as a Senior Research Chemist/AFRL Fellow in October 2002.
4. I am one of the inventors of the subject matter of the above-identified application.

5. The following facts show a conception and reduction to practice of the above-identified invention before April 7, 2002:

Before April 7, 2002, I developed new rigid-rod benzobisazole polymer compositions incorporating 1,5-naphthalene-diyl units for potential utilization as non-conducting high modulus fibers in structural composites for Air Force applications. Besides conventional reinforcement, other areas of application for these high performance polymers include protective garments, ballistic vests and abrasion- and flame-resistant fabrics. The invention takes advantage of the unique conformational possibilities and torsional behavior of the polybenzobisazole chains containing 1,5-naphthalic segments which will influence the mechanical properties of the polymeric fibers. This development is described in University of Dayton Research Institute (hereinafter referred to as "UDRI") Technology Disclosure No.349. A copy of this Technology Disclosure Form is attached.

In particular, the Page 3 of 5 of the attached Technology Disclosure Form show that the relevant dates are as follows:

**1,5-Naphthalenedicarboxylic acid (monomer) (07/23/01):**

A new method is described for the preparation of this diacid monomer starting with 1,5-diaminonaphthalene as starting material. The process of conversion of 1,5-naphthalenedinitrile to the dicarboxylic acid monomer is described with the date of 07/23/01.

**1,5-Naphthalenebenzobisthiazole (polymer) (08/28/01 and again, 11/27/01):**

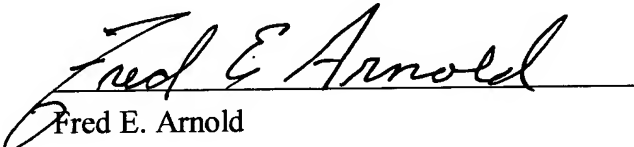
The high temperature polycondensation of 1,5-naphthalenedicarboxylic acid with 2,5-diamino-1,4-benzenedithiol dihydrochloride in polyphosphoric acid with final polymer concentrations of 10 wt % and 12 wt % respectively are described on the dates as indicated above.

**1,5-Naphthalenebenzobisoxazole (polymer) (02/15/02):**

The high temperature polycondensation of 1,5-naphthalenedicarboxylic acid with 4,6-diamino-1,3-benzenediol dihydrochloride in polyphosphoric acid , with a final polymer concentration of 14 wt %, is described on the date indicated above.

6. All acts described herein were conducted in the United States of America before April 7, 2002.
- 7 I further declare that all statements made herein are of my own knowledge and are true; and that all statements made on information and belief are believed to be true; and further that the statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001, Title 18, of the United States Code and that such willful false statements may jeopardize the validity of the above-identified application or any patent issue thereon..

Dated: 11/ 30/2005

  
Fred E. Arnold

AFD 645 Rule 131.doc